In the claims:

1. (New) A downhole electric motor having at least three phases and comprising a permanent magnet rotor and a stator bearing phase windings in slots in the stator, each phase winding incorporating a plurality of coils each extending through a respective pair of closed stator slots and surrounding a respective portion of the stator between said stator slots, and adjacent coils of different phases extending through opposite parts of a respective one of the stator slots.

2. (New) A motor according to claim 1, wherein said adjacent coils are separated by a gap through which cooling fluid may be pumped to cool the coils.

3. (New) A motor according to claim 1, wherein said adjacent coils are separated by a thermally conductive projection, with which the coils are in thermal contact, extending at least part of the way across the slot.

4. (New) A motor according to claim 1, wherein the stator incorporates nine windings extending through nine slots and consisting of three windings for each phase.

5. (New) A motor according to claim 1, wherein the stator incorporates twelve windings extending through twelve slots and consisting of four windings for each phase.

6. (New) A downhole electric motor having a rotor and a stator bearing phase windings in slots in the stator, the stator being made up of first and second concentric parts which together define the slots in the stator so as to permit the phase windings to be fitted to the first part prior to fitting of the second part to enclose the phase windings within the slots, wherein a projection is provided on one of the concentric parts for extending at least part of the way across one of the slots to separate adjacent windings within the slot.

7. (New) A downhole electric motor having a rotor and a stator bearing phase windings in slots in the stator, the stator being made up of first and second concentric parts which together define the slots in the stator so as to permit the prefabricated phase windings to be fitted to the first part prior to fitting of the second part to enclose the phase windings within the slots, wherein the slots are substantially shaped to conform to the cross-section of the phase windings in order to provide close thermal contact and mechanical support between the phase windings and the surrounding material of the stator.

8. (New) A downhole electric motor having a rotor and a stator bearing phase windings in slots in the stator, the stator being made up of first and second concentric parts which together define the slots in the stator so as to permit the prefabricated phase windings to be fitted to the first part prior to fitting of the second part to enclose the phase windings within the slots, wherein at least one of the concentric parts comprises a preassembled stack of laminations to which the other of the concentric parts is fitted to enclose the phase windings within the slots.

9. (New) A downhole electric motor having a rotor and a stator bearing phase windings in slots in the stator, the stator being made up of first and second concentric parts which together define the slots in the stator so as to permit the prefabricated phase windings to be fitted to the first part prior to fitting of the second part to enclose the phase windings within the slots, wherein at least one of the concentric parts is cast from insulated ferromagnetic powder and is fitted to the other of the concentric parts to enclose the phase windings within the slots.

10. (New) A motor according to claim 9, wherein said at least one of the concentric parts comprises a plurality of cast arcuate segments.

11. (New) A motor according to claim 6, wherein the stator comprises a stack of laminations extending transversely of an axis of rotation of the motor, each lamination comprising a first portion incorporated in the first part of the stator and a second portion

incorporated in the second part of the stator.

12. (New) A motor according to claim 6, wherein the first part of the stator comprises an inner cylindrical member having slots in its outer surface separated by lands and the second part of the stator comprises an outer annular member that surrounds the first part such that portions of an inner surface of the second part engage outer portions of the lands of the first part.

13. (New) A method of constructing a downhole electric motor having a rotor and a stator bearing phase windings in slots in the stator, the method comprising the steps of fitting phase windings to a first part of the stator, and combining the first part with a second part of the stator concentric with the first part so as to enclose the windings within slots, a projection on one of the concentric parts extending at least part of the way across one of the slots to separate adjacent windings within the slot when the first part is combined with the second part.

14. (New) A method of constructing a downhole electric motor having a rotor and a stator bearing phase windings in slots in the stator, the method comprising the steps of fitting phase windings preassembled with an outer layer of insulating material to a first part of the stator, and combining the first part with a second part of the stator concentric with the first part so as to enclose the windings within slots with the outer layer of insulating material serving to insulate the windings from the surrounding material of the stator.

15. (New) A method according to claim 14, wherein a projection on one of the concentric parts extends at least part of the way across one of the slots to separate adjacent windings within the slot when the first part is combined with the second part.

16. (New) A method according to claim 13, which includes the further step of inserting the first and second parts of the stator with the windings fitted thereto into a housing

prior to insertion of the permanent magnet rotor.

17. (New) A method according to claim 13, wherein laminations of the stator are rotationally aligned by means of features on an alignment tool or inserts mounted thereupon.

18. (New) A method according to claim 13, wherein the first and second parts of the stator are connected together by compression.

19. (New) A method according to claim 13, wherein the windings are preformed before being fitted to the first part of the stator.

20. (New) A method according to claim 13, further comprising the step of grinding the stator on the outside diameter.

21. (New) A downhole electric motor having a first multiple-phase section and a second multiple-phase section and separate supply leads for supplying said first and second sections with electrical power from the surface.

22. (New) A motor according to claim 21, wherein the first and second sections comprise two sets of phase windings wound on a common stator such that the motor may be driven by supply of power to only one of the sections in the event of failure of power to the other section.

23. (New) A motor according to claim 22, wherein the first section comprises a first set of phase windings wound on a first motor stator and the second section comprises a second set of phase windings wound on a second motor stator with common rotor or mechanically coupled rotors.

24. (New) A method of constructing a downhole electric motor having a rotor and a stator bearing phase coils in slots in the stator, the method comprising the steps of

fitting open ended conductive loops within the slots in the stator, and closing the conductive loops to form the phase coils.

25. (New) A method according to claim 24, wherein an insulating layer is provided on side surfaces of the conductive loops.

26. (New) A permanent magnet motor having a rotor provided with permanent magnet means, and a stator coaxial with the rotor, wherein the permanent magnet means is provided with an anti-corrosion coating.